the next day by a variety of species, including a flock of eleven Prions.

On October 1 in the bay at Capetown, before entering the harbour, we saw numerous little parties of Jackass Penguins *(Spheniscus demersus)*, their fearless behaviour being in marked contrast to the timidity of our local Fairy Penguin *(Eudyptula minor)* and made me wonder at the cause.

Passing along the coast to Durban many Cape Hens, Cape Petrels and Albatrosses were seen, but after leaving that port on October 6, my diary is a blank for several days until at Lat. 33° 15' S., Long. 42° 24' E., I noted my first Yellow-nosed Albatross *(Diomedea chlororhynchos)* and Giant Petrel *(Macronectes giganteus)*. These with the Wandering Albatross, Cape Petrels and Cape Hens were then our companions for several days. On one occasion a Cape Hen was noticed which had lost one of its flight feathers and was, therefore, conspicuous from its fellows; this bird attended the ship for three successive days and then vanished.

On October 15, when at Lat. 36° 05' S., Long. 85° 05' E., the assemblage of birds was increased by the presence of the Sooty Albatross *(Phoebetria sp.)* which, however, did not come close enough to enable the colour of its mandibular sulcus to be distinguished—the slender bill and less laboured flight showed it was not a Giant Petrel.

The vessel was now in the vicinity of the islands in the mid-Indian Ocean, so that a considerable increase in the bird population seen was not surprising. Prions skimmed the waves in their characteristic fashion, vanishing when the blue backs were showing but flashing into view when a turn revealed the white under-surface. Individuals of the Black-browed Albatross *(Diomedea melanophrys)* appeared together with a strange petrel which seemed to be the Grey Petrel or Pediunker *(Procellaria cinerea)*. The next day three skuas *(Catharacta skua)* put in an appearance, one even spending some considerable time perched on a mast.

The last Cape Hen was seen on October 16, but the Cape Petrels remained still with us and also the Wandering and Black-browed and the Yellow-nosed Albatrosses. On October 19, the day before reaching Rottnest Island, the last Wandering Albatross left, the Yellow-nosed not disappearing until Rottnest itself came into view. Here we were greeted by Silver Gulls and the local species of terns, indicating that the ocean voyage was over.

WESTERN AUSTRALIAN JEWEL BEETLES

By F. LAWSON WHITLOCK, Bunbury.

In modern times, there has never been any lack of bird-lovers and present-day publications further popularise their study. On the whole, birds are the friends of man and are perhaps his

greatest natural ally in keeping down the hordes of insect life, with their marvellous powers of reproduction. But it is not the study of birds I wish to draw attention in this short paper but to insects alone. It is highly important that a rising generation of students should concentrate their efforts on the vast insect world, whether they live in town or country for insects are found in more or less abundance everywhere and at all times of the year.

In butterflies, alas! the West is not much favoured by nature. Only between seventy or eighty species are known to occur in our vast territory, though doubtless as the far North is more closely explored other species will be added, some perhaps new to science. But in the realm of Coleoptera or beetles, the case is the reverse. To become fully acquainted with all the beetles of Australia would entail the work of a lifetime, so I am confining my remarks to one great family—the Buprestidae or jewel beetles. This highly favoured by nature family contains a wealth of beautiful forms which cannot fail to appeal to all lovers of chaste and brilliant aspect whether in form or feature. Moreover, jewel beetles do not require journeys to districts far afield as a great many may be found in the coastal sandhills, country lanes, and even in our own gardens.

In Australia, about 800 species are recorded, and nearly 20 years ago, the late Mr. H. J. Carter published a list of 772 species with information as to which of the States each species is to be found ("A Check List of the Australian Buprestidae" *The Australian Zoologist,* vol. 5, pt. iv., March 24, 1929, pp. 265-304; with tables and keys to sub-families, tribes and genera). Mr. Carter specially studied the whole family and became our leading authority up to the time of his death some three years ago. He divided it into 60 genera. The genera containing the greatest number of species are as follows:—*Castiarina,* 254; *Themognatha,* 125; *Melobasis,* 65; *Cisseis,* 46; other smaller genera contain a dozen to a score.

All can easily be recognised as Buprestidae by their elongate shape, conspicuously coloured thorax, short-pointed antennae and metallic legs and underparts. But it is the highly coloured and patterned character of the wing covers that irresistibly attract attention to these appropriately named jewels. Shades of green dusted with gold or copper, are typical of many. Others are decorated with creamy white or reddish backgrounds conspicuously marked with crossbands of black and in a few, notably in the genus *Cisseis,* white dots, geometrically arranged, take the place of dark bands, the background being a deep claret colour. The white dots in others are replaced by short silvery hairs all strictly arranged in unvarying patterns. Again the whole wing covers may be a uniform indian red, except the tips which are black and the cover longitudinally grooved but the diversity of colour and shading is endless. I must refer to size, which varies as much as shading and colouration. Of the 245 species known to inhabit

the West, the largest I have ever met with measured nearly two inches in length with a proportionate width. It is an experience to see and hear this fine insect booming along in a steady straight flight. The male is rather less in size than the female. I first met with this colossus up the Midland Railway near to Mogumber and again at Arrino. But there are others nearly as large to be found in the wheat belt and beyond towards Coolgardie.

Cultivation has little to do with the distribution of jewel beetles, so long as native bushes, such as acacias and other small trees are left standing around paddocks. There they will be found in due season, which usually coincides with the flowering period. But there is no need for dwellers in big cities like Perth to travel far before they can reasonably expect to meet with equally fine species. Here at Bunbury on the coastal plain, which extends miles to the north of Perth, is to be found a tree known as the Peppermint *(Agonis flexuosa)*. It is a tree of no great size and on the coastal sandhills is reduced to a dense scrublike growth often not more than four feet in height. These trees and scrubs flower early in the spring. By the end of September they should be full of their small thickly growing white flowers. The flowers are the favoured food of two fine and beautiful jewels, and also of several pretty but less conspicuous species.

I usually commence my search the first week in October, choosing a reasonably sunny day with a moderate wind, or better still, a calm. The species I am searching for is a large one, the females being about an inch and a half in length, the males rather smaller. Cautiously approaching a mass of scrub or a small bush with plenty of flowers I give it a preliminary glance over before going nearer. It is easy to realise that large insects coloured green and decorated with red crossbars are fairly conspicuous. When I spot one, I carefully insert my net or even my hat underneath and pick the beetle off with my fingers. A little practice makes one deft at the operation, but if a mischance occurs, the net below will remedy the bungling, for all the jewel beetles I am acquainted with have the habit of dropping down in an inert condition. This is very convenient for a collector, as long as he does not forget to insert the net below his objective. To search for a beetle in scrub and herbage into which it has fallen is usually a hopeless task.

This large species, *Stigmodera cancellata,* is by no means rare, but it must not be forgotten that certain trees and bushes are favoured to others quite nearby. The species flies freely but rather heavily and erratically, and it is not often one can net it on the wing. A second and very brilliant species is to be found a little later and in similar situations. It is appropriately named *Themognatha gloriosa.* It is not quite as large but makes up for this in its striking brilliance of colour. It is a good flyer so low bushes offer the best chances for its capture. If approached cautiously the brilliant, highly polished golden thorax is sure to catch

the searcher's eye. The wing covers are of a brilliant emerald green, but if this beetle is resting with only the profile exposed to view, it is by no means easy to see; usually where one is found there will be three or four more close at hand. After quietly examining the bush with the eye it is often a good plan to gently beat the clusters of flowers over the net held underneath. Often an overlooked specimen is thus secured. The wing cases of this brilliant species are occasionally used in the making of bracelets or collarettes, the result being very effective.

A method of capturing the larger *S. cancellata* has been developed by the enterprising Australian boy. The larva feeds on the wood of the Peppermint tree. Its presence when the perfect insect is ready for flight is betrayed by the open gallery leading to daylight. Into the opening the boy blows the smoke of a cigarette or other combustible. Plugging in the smoke with the tip of his finger he waits until the insect within tickles his finger tip in its efforts to escape the smoke. One boy showed me a large tobacco tin containing nearly a score of specimens obtained by this method.

Smaller species of *Castiarina* such as *C. cincta* may be found about the end of October by patient watching when a favoured tree is located. They must be swept off the flowers by a sharp stroke of the net to effect a sure capture as they are easily alarmed and are quick off the mark. A still smaller and curiously marked species, *Cuaris discoflava,* is coloured cream and dark green. Both these smaller species are metallic green beneath, but this is apt to fade to dark blue after death.

Another common coastal shrub is well-worth searching during the warm weather period from December to April. It is apparently a species of *Patersonia,* of a spreading habit with a usual height of from three to six feet. The foliage is rather dense and somewhat spiky. The flowers, bright yellow and very numerous, appear to be very attractive to jewel beetles and other insects such as bees and wasps. The commonest jewel found in them is *Melobasis lathami.* It is considered to be a very variable beetle and six varieties have been described and named. Mr. Carter lumps them all together as one species. I have had exceptional opportunities to collect a good series of this beetle, and I find no evidence of interbreeding amongst the different varieties which occur at different periods of the warm season. So I am inclined to the view that in reality we have several distinct species. All are of a similar slender shape but differ greatly in size and colouration. The largest specimens I have are about three-quarters of an inch in length and the smallest about three-eighths. The upper surface varies from a dull dark green to a silvery shining green with a narrow reddish band along the margins of the wing covers. Beneath all are a metallic bronze or dark green; one pair I captured were brilliant emerald green. When on the wing the abdomen shows a bright blue. These beetles may be spotted by running the eye over the flowers and amongst the spiky foliage, where they are easily

to be seen. On a cool cloudy day they can be beaten out of shelter by smartly tapping the clusters of branchlets, the net being held underneath. This beetle is an adept at shamming death. When the contents of the net are examined by tipping out on a bare place, all the vegetable rubbish, ladybirds, weavils and a variety of other life will be found.

In some seasons other jewels will turn up, belonging to the genus *Cisseis*. This genus is not a very showy one. Deep claret or plum colour prevails, but all species have their distinctive markings, which most often take the form of white dots forming a regular pattern. Two conspicuously dotted species are found on the foliage of blackboys on which they feed. To catch these one must approach the low blackboys cautiously, and when one is spotted at rest on the narrow foliage, strike swiftly and surely as they are quick off the mark. The first is known as *Cisseis 14-punctata*, the second as *C. stigmata*, the latter is beautifully shot with gold dust about the head and thorax. December and January are the best months for both. I have one of the spotted species taken in a Nedlands garden, but this is a larger insect.

Not all jewel beetles are brilliant above; the members of the genera *Curis*, *Neocuris* and *Ethon* are all dark-coloured insects when seen from above and some are inclined to small size, but a pocket lens will reveal the beautiful sculpturing of the wing cases.

Not much equipment is required for hunting jewel beetles. A gauze net, which can be made at home, encircling a ring of stiff fencing wire and terminating with a handle to be stepped into a metal socket or a length of electric light tubing, is all that is really necessary. To reach flowers at a height, a bamboo rod is needed. Then there is the killing bottle. Cyanide is a deadly poison and difficult to obtain, but petrol fumes are quite as effective. Obtain a small glass bottle with a wide mouth and a good-fitting cork, then get a wad of cotton wool and on this pour a teaspoonful of petrol. The captured insect is overcome by the fumes in a few seconds, but leave it in the bottle for an hour. The dead specimens should be enclosed in an airtight tin over night containing wet blotting paper or wadding. Next day *rigor mortis* will have been relaxed and the specimens can be carded with the antennae and legs in a natural position. Name, date and locality are to be marked on the card.

Not every year produces a good "Stig" season. An experienced collector told me that one in every three is the average. I find this is about correct, but some summers favour one species, some another. Just now (end of January) Quandong flowers are at their best and the variety of all sorts of bees, wasps, hornets and large flies visiting them is full of interest. Several species of "Stigs" also are attracted.

As a final remark let me state that the study of entomology has a very stimulating effect on the eyesight which becomes acute in a very short time.